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Green Tea Polyphenols decrease the formation of advanced glycation end products in UHT milk

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Maillard reactions adversely affect the quality of dairy products by triggering numerous chemical modifications [1] and their control has proven to be a challenging task for the dairy industry. Our previous research has shown that plant polyphenols, particularly green tea extracts (GTE), efficiently inhibits the formation of Maillard reaction products such as Strecker aldehydes in lactose-hydrolyzed ultra high temperature treated (UHT) milk [2]. In the present work, as a continuation, we have attempted to investigate the role of GTE in the Maillard reaction pathway by characterizing and quantifying the advanced glycation end products (AGEs) in UHT milk stored at ambient temperatures for extended period. The high resolution accurate mass spectrometric analysis revealed that the concentration of both lysine and arginine derived AGEs such as N ϵ -(2-furoylmethyl)-L-lysine (furosine), N ϵ -(carboxymethyl)-L-lysine (CML), N ϵ -(carboxyethyl)-L-lysine (CEL), methylglyoxal hydroimidazolones (MG-H1 and MG-H3), glyoxal-derived hydroimidazolones (GO-H1, GO-H2 and GO-H3), glyoxal-derived lysine dimer (GOLD), methylglyoxal lysine dimer (MOLD) and alpha-arginine-pyrimidine (Arg-Pyr) increased in the control milk samples during storage up to 6 months. The GTE, nevertheless, reduced the amounts of Arg-derived AGEs such as MG-H1, MG-H3, GO-H1, GO-H2 and GO-H3, but did not affect the content and concentrations of Lys-derived AGEs, except GOLD and MOLD.

Keywords:

Maillard reaction, lactose-hydrolyzed milk, UHT, green tea extract, epigallocatechin gallate, shelf life, Advanced glycation end products.

References:

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